PRODUCT USER MANUAL

For In Situ Products

Delivered by MyOcean

INSITU_GLO_NRT_OBSERVATIONS_013_030
INSITU_MED_NRT_OBSERVATIONS_013_035
INSITU_NWS__NRT_OBSERVATIONS_013_036
INSITU_BAL_NRT_OBSERVATIONS_013_032
INSITU_IBI_NRT_OBSERVATIONS_013_033
INSITU_ARC_NRT_OBSERVATIONS_013_031
INSITU_BS_NRT_OBSERVATIONS_013_034
INSITU_ARC_TS_REP_OBSERVATIONS_013_037
INSITU_BAL_TS_REP_OBSERVATIONS_013_038
INSITU_IBI_TS_REP_OBSERVATIONS_013_040
INSITU_BS_TS_REP_OBSERVATIONS_013_042
INSITU_MED_TS_REP_OBSERVATIONS_013_041
INSITU_NWS_REP_OBSERVATIONS_013_043

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Issue	Date	§	Description of Change	Author	Validated By
1.0	30/10/2011	All	Creation of the document	S Pouliquen and INSTAC Partners	S Pouliquen
1.1	30/10/2012	9	Merging NRT products	S Pouliquen	S Pouliquen
1.2	07/02/2013		Adding History Directory	S Pouliquen	S Pouliquen

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- **Global attribute "platform_code" : The global attribute "platform_code" is mandatory in MyOcean NetCDF data files. *It is unique within all MyOcean INS TAC portals* .** **16**
- **Global attribute "wmo_platform_code" :It contains the Call Sign assigned by WMO (World Meteorological Organization).This attribute is not mandatory. If it does not exist (example: sea-level stations do not have Call Signs), the attribute is not inserted in the NetCDF file.If it exists, but is not known (example: a drifting buoy), the attribute is left empty.** **16**
- **Global attribute "ices_platform_code": It contains the platform code assigned by ICES (International Council for the Exploration of the Sea).This attribute is not mandatory. If it does not exist (example: drifting buoys do not have ICES codes), the attribute is not inserted in the NetCDF file.If it exists, but is not yet known (example: a research vessel), the attribute is left empty.** **16**

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GLOSSARY AND ABBREVIATIONS

TAC	Thematic Assembly Centre
INS	In Situ
NetCDF	Network Common Data Form
CF	Climate Forecast (convention for NetCDF)
T	Sea Temperature
S	Sea Salinity
SL	Sea Level
O2	Oxygen
U,V	The two components of the current vector
CHL	Chlorophyll
PC	Production Centre
PU	Production Unit
ftp	Protocol to download files
OpenDAP	Open-Source Project for a Network Data Access Protocol. Protocol to download subset of data from a n-dimensional gridded dataset (ie: 4 dimensions: lon-lat, depth, time)
EUROGOOS	European Global Observing System
ROOS	Regional Observing System for
Arctic ROOS	Artic
BOOS	Baltic
NOOS	North West Shelves
IBI-ROOS	Iberic-Biscay-Irish Seas
MOON	Mediterranean Sea
Black Sea GOOS	Black Sea

I INTRODUCTION

This guide describes the data product files from the MyOcean In Situ Thematic Centre, what data services are available to access them, and how to use the files and services.

The INS-TAC is a distributed system built on the existing activities and services developed previously within the EC supported projects (Mersea, MFSTEP, FerryBox, SEPRISE,…) and EuroGOOS Regional alliances (ROOSes). It aims at providing a research and operational framework to develop and deliver in situ observations and derived products based on such observations, to address progressively global but also regional needs either for monitoring, modelling or downstream service development.

The INS-TAC provides the interface between centres, distributing in situ measurements from national and international observing systems. The MERSEA project established the Global component of the INS-TAC for the physical parameters needed by the Marine Forecasting Centres (MFC) that are using the data for assimilation and validation of the forecasting systems. These efforts result in the strong enhancement of the French Coriolis data centre. The goal within MyOcean is to consolidate and integrate the regional components, based on expertise developed within the ROOSes, and to initiate the set up of the bio-geochemical part of the INS-TAC. In addition, considerable benefits to the Global Monitoring for Environment and Security (GMES) In Situ users will be gained in terms of in situ product choice, service, timeliness, quality, robustness and accuracy. As an operational infrastructure, the INS TAC sets the necessary production capacities and quality control procedures to answer to Europe's request for service level agreements with the external users as defined in MyOcean.

The INS-TAC Version 0 is a heritage of all the work performed in previous projects. The operational products proposed for this version are near real time and re-processed data for global ocean via Coriolis data centre. The Version 1 of MyOcean INS-TAC complements these products by delivering suitable products for all European regions, new lines of products (real time, biogeochemistry) and to apply improved validation procedures for the products and services. The Version 2 of MyOcean INS TAC prepares Temperature and Salinity re-analysed datasets for reanalysis activities performed by the MyOcean MFCs and external users in collaboration with the SeaDataNet infrastructure for the global ocean and regional seas.

In situ products provided within MyOcean include:

- Temperature and salinity: global and regional, produced in RT (all) and DM (all)
- Currents: global and regional, produced in RT (global, NWS, MedSea, Baltic)
- Sea level: regional, produced in RT (IBI, NWS, Baltic)
- Biogeochemical: global and regional, produced in RT (all)

II GENERAL INFORMATION

The INS-TAC is a distributed centre organized around 7 oceanographic regions: the global ocean and the 6 EUROGOOS regional alliances (see Figure 1). It involves 14 partners from 11 countries in Europe. It doesn't deploy any observing system and relies on data, exclusively funded by other sources than MyOcean.

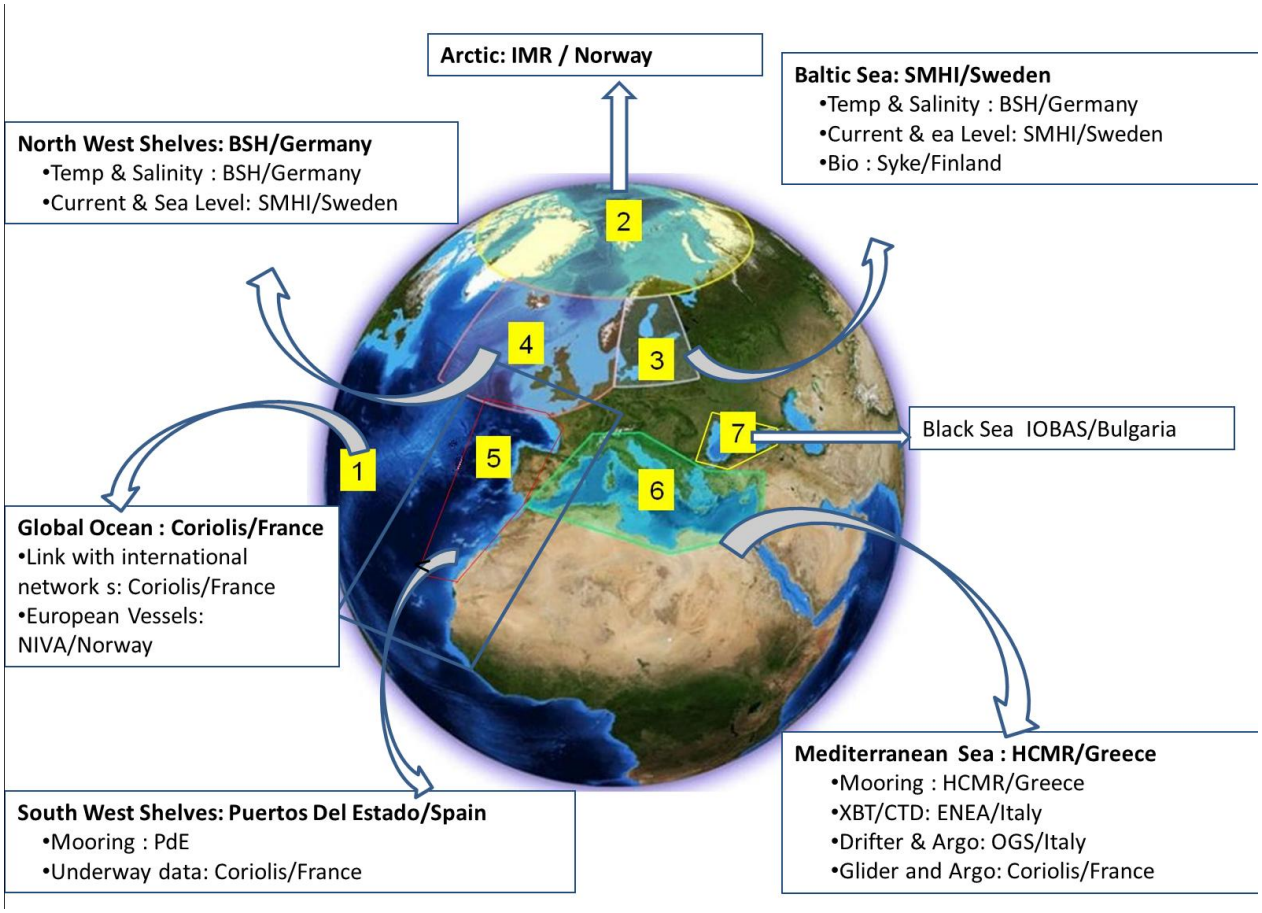


Figure 1 : The INS TAC components

The in-situ TAC architecture is decentralized. However, quality of the products delivered to users must be equivalent wherever the data are processed. The different functions implemented by the global and regional components of the In Situ TAC are summarized in Figure 2.

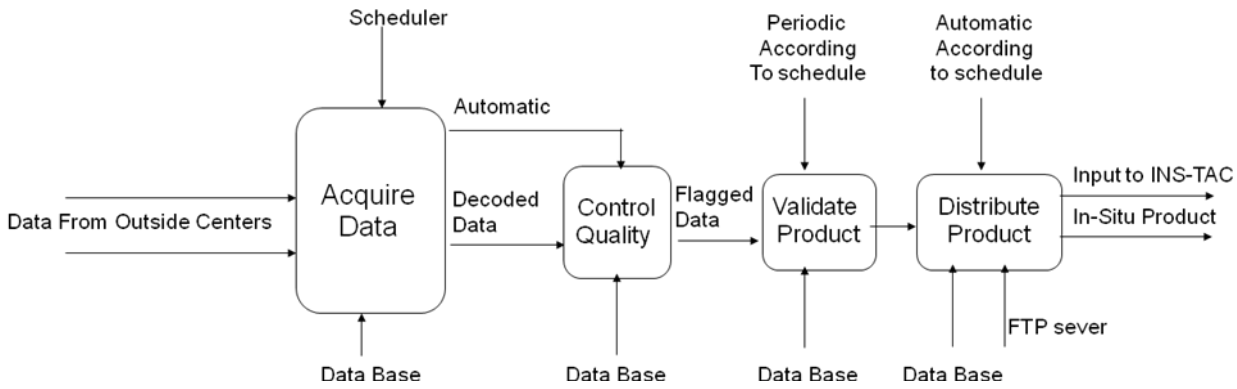


Figure 2: Functions to be implemented by an in situ TAC component

Each region implements the 4 core functions:

- Data Acquisition
- Data Quality control
- Product validation
- Product distribution

Each region has organized the activities according to the expertise and background in data management for operational oceanography.

1. The 4 functions are implemented in one institute per region (e.g.: Arctic, Black Sea);
2. Acquisition and QC is done by platforms (Baltic , NWS, SWS, Mediterranean Sea and Global), one institute takes care of the validation and distribution is centralized.

In any case, the Global component of the In Situ TAC collects the data from the regional components and integrates them into the global product acting as a backup of the regional centres.

The main distribution channel for the INS TAC is FTP. OGC viewing service (WMS) and SUBS Subsetter access have been developed within MyOcean and setup gradually through 2012-2014.

The present document:

- Describes the architecture of the portal implemented by the in-situ TAC global and regional components;
- Refers to the documents describing the product formats and the agreed quality control procedures.

III HOW TO DOWNLOAD A PRODUCT

III.1 Download an In Situ product

You first need to register. Please find below the registration steps:
http://www.myocean.eu/web/34-products-and-services-faq.php#1

Once registered, you can access INS TAC products (Myocean FTP MFTP access") using your MyOcean userid . In case of problem contact the MyOcean service desk (servicedesk@myocean.eu.org)

IV DESCRIPTION OF THE PRODUCT SPECIFICATION

When an in situ platform measures more than one parameter, it's important to distribute all the parameters together as an anomaly on one parameter can either be present on another parameter or is a real phenomenon that is also visible on the other parameter.

Users are often interested in one or a list of parameters and it's important to help him finding the platforms and the files on the portal that provide such observation. This is done by providing index files, located at the top of the FTP portal and providing information on each platform and file located on the server

Detailed information on the systems and products are on MyOcean web site: www.myocean.eu .

IV.1 Details of datasets

The following manual applies to the following list of products described in MyOcean Catalogue

Short Description	Product code	Area	Delivery Time
Global NRT	INSITU_GLO_NRT_OBSERVATIONS_013_030	Global	daily
Med NRT	INSITU_MED_NRT_OBSERVATIONS_013_035	Med	daily
NWS NRT	INSITU_NWS__NRT_OBSERVATIONS_013_036	NWS	daily
BAL NRT	INSITU_BAL_NRT_OBSERVATIONS_013_032	Baltic	daily
IBI NRT	INSITU_IBI_NRT_OBSERVATIONS_013_033	IBI	daily
Arctic NRT	INSITU_ARC_NRT_OBSERVATIONS_013_031	Arctic	daily
Black Sea NRT	INSITU_BS_NRT_OBSERVATIONS_013_034	Black Sea	daily
ARC REP	INSITU_ARC_TS_REP_OBSERVATIONS_013_037	Arctic	yearly
BAL REP	INSITU_BAL_TS_REP_OBSERVATIONS_013_038	Baltic	yearly
IBI REP	INSITU_IBI_TS_REP_OBSERVATIONS_013_040	IBI	yearly
Black Sea REP	INSITU_BS_TS_REP_OBSERVATIONS_013_042	Black Sea	yearly
MED REP	INSITU_MED_TS_REP_OBSERVATIONS_013_041	Med	yearly
NWS REP	INSITU_NWS_REP_OBSERVATIONS_013_043	NWS	yearly

Table 2: List of INS TAC products for which this manual apply

V REGIONAL AND GLOBAL DATA DISTRIBUTION

The distribution is based on regional portals that allow, from a single point, access to the Real-Time and historical data collected and validated for a specific region. These portals provide access to the **best available version of a data at that time**. The INS TAC is based on 7 portals distributing the data the same way:

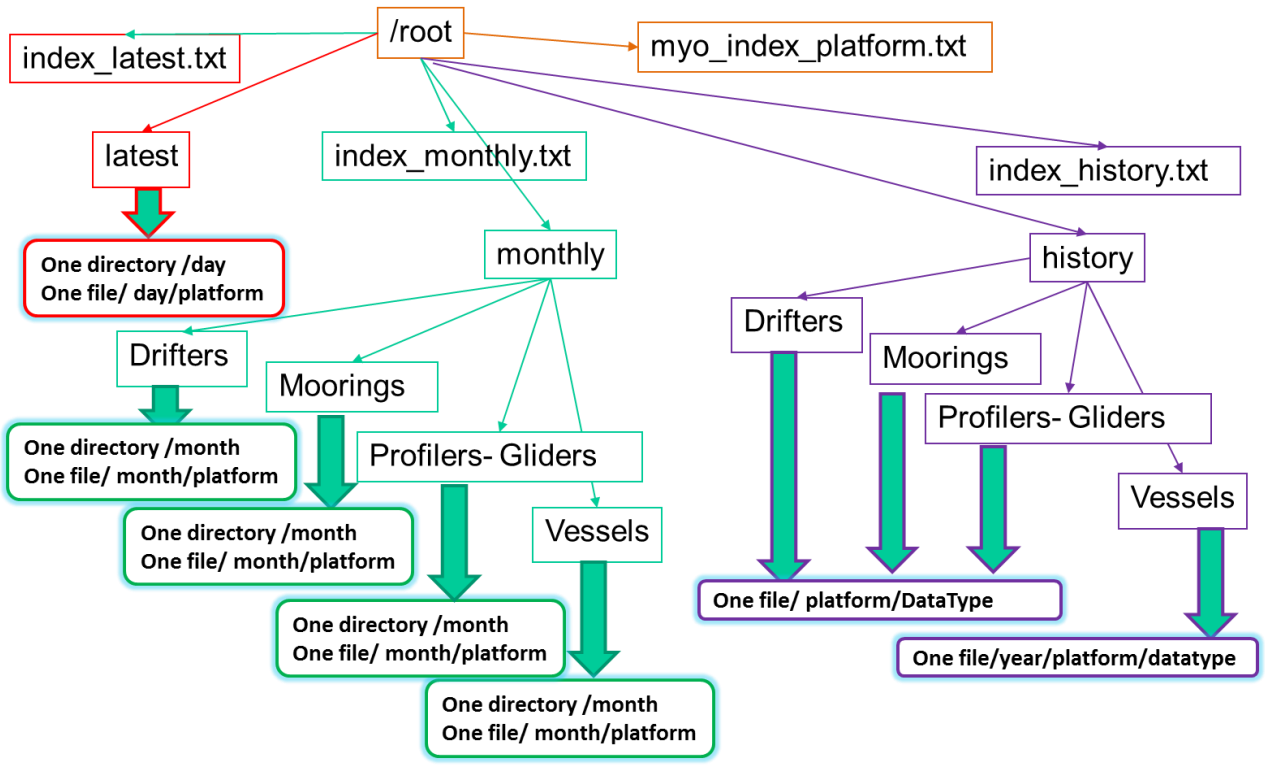
- **Same format:** the OceanSites NetCDF(V1.1) format has been chosen because it is CF compliant, it relies on SeaDataNet vocabularies, it is able to handle profiles and time series data coming from floats, drifters, moorings, gliders and vessels.
- **Same FTP portal organization:** Three main directories:
  - Latest: providing access to a sliding window on the latest 30 days of observations for real-time applications
  - Monthly: accumulating the best copy of a dataset, organized by platform and by month
  - History: providing access to the best quality copy of an observation organised by platform
  - Index files to able automatic download
- **Same advanced web services** (WMS, CSW, WFS) to allow viewing and downloading applications (under development).
- **Extendable to other parameters** to fulfil the EUROGOOS region needs.

On a regular basis (ie: every hour), each Regional centre (RDAC) distributes all its new data on its regional portal. The regional portal is a FTP site where data files are regularly distributed.

On a regular basis (ie: every hour), the Global data centre (GDAC) collects all new files from all Regional centres and integrate them on the Global centre server. The Global data centre does not apply any quality control (quality control is under Regional data centres responsibility).

V.1 Portal ftp structure

The directory organization of each ftp portal is described below:



Three index files describe the content of latest, monthly and history directories: index_latest.txt, index_monthly.txt and index_monthly.txt. They are useful for synchronization between the RDACs and the GDAC and for automatic data collection by users.

- The "latest" directory contains the latest 30 days of data . It contains one directory per day named YYYYMMDD . Each directory contains one file per platform per day
- The "monthly" directory contains 5 directories. Each directory contains on directory per month named YYYYMM which contains a file per month and per platform:
  - drifter: for drifters observations
  - mooring: for fixed point sites including tide gauges
  - profiler-glider: for Argo floats, coastal profilers and gliders
  - vessel: for research vessels, VOS and fishing boats
  - etc: for other types of platforms (or unknown platforms)
- The history directory is dedicated to long series of observations. It is regularly updated but there is no fixed schedule for updates (planned to be yearly). When observations are delivered on the history directory, they may not be removed from monthly directory. **If a dataset is available both in monthly and history directories, the user is advised to**

use the history directory one in priority as it will be better validated. The history directory contains 4 directories:

- drifter: for drifters observations : one file per platform per type of data
- mooring: for fixed point sites including tide gauges: one file per mooring per type of data
- profiler-glider: for floats and gliders: one file per platform per type of data
- vessel : one file per vessel, per year and per type of data or one file per oceanographic cruise. In the case of a virtual mooring, one file per platform per type of data.

File naming convention in the latest directory:

- RR_LATEST_XX_YY_CODE_YYYYMMDD.nc
- RR: region bigram (see §VI)
- LATEST: fixed name
- XX: TS (timeserie) or PR (profile)
- YY: data type
- CODE: platform code[1]
- YYYYMMDD: year month day of observations
- .nc: NetCDF file name suffix

Example: IR_LATEST_TS_DB_44607_20091117.nc

File naming convention in the monthly directory:

- RR_YYYYMM_XX_YY_CODE.nc
- RR: region bigram (see §VI)
- YYYYMM : measurement date (YearMonth : 200901)
- XX: TS (timeserie) or PR (profile)
- YY: data type
- CODE: platform code
- .nc : NetCDF file name suffix

Example: IR_200911_TS_DB_44607.nc

File naming convention in the history directory:

- RR_XX_YY_CODE<_ZZZ>.nc
- RR: region bigram (see table 2)
- XX: TS (timeserie) or PR (profile)
- YY: data type
- CODE: platform code

[1] This platform code appears in the netCDF file as the global attribute "platform_code"

- _ZZZ : optional sub-setting code, may be a year for a group of CTDs, a cruise code, a deployment code for a mooring
- .nc : NetCDF file name suffix

Examples:
IR_TS_DB_44607.nc : all data from buoy 44607

GL_PR_PF_69001.nc : all vertical profiles from float 69001

GL_PR_CT_FNFP_2010.nc : all CTDs from Thalassa research vessel measured in 2010

MO_PR_GL_68450_201111.nc : all vertical profiles from Pheidippides glider for the deployment of November 2011

GL_TS_MO_15001_2010daily.nc : all data from Pirata Gavotte buoy, daily averages

GL_TS_MO_15001_2010hires.nc : all data from Pirata Gavotte buoy, full resolution (10 minutes data)

Data types:

- BA data from Bathy messages on GTS
- BO bottle data
- CT oceanographic CTD profiles
- DB drifting buoys
- DC drifting buoy reporting calculated sea water current
- FB ferrybox
- GL gliders
- MO fixed buoys or mooring time series
- ML mini logger
- PF profiling floats vertical profiles
- RF river flows
- TE data from TESAC messages on GTS
- TS thermosalinograph data
- XB XBT or XCTD profiles

V.2 Description of data files index

The index files are updated to describe all the files available in the latest, monthly and history directories.

Each index file contains one line per file:

- product_id : MYO-XX-YY
  - MYO: MyOcean trigram
  - XX: region bigram (see §VI)
  - YY: product version

Example: MYO-NO-01

- file_name
- geospatial_lat_min
- geospatial_lat_max
- geospatial_lon_min
- geospatial_lon_max

- time_coverage_start
- time_coverage_end
- provider
- date_update
- data_mode
  - R: real-time data
  - D: delayed-mode data
- parameters (separator : blank)

Index names: index_monthly.txt , index_latest.txt and index_history.txt.

Index lines order: the lines in the index are sorted by file name and time coverage start.

MyOcean in-situ data file index example

```
# Title : in-situ observations catalog
# Description : catalog of available in-situ observations per platform.
# Project : MyOcean
# Format version : 1.0
# Date of update (Date and Time): 20120621094501 local time
# catalog_id,file_name,geospatial_lat_min,geospatial_lat_max,geospatial_lon_min,geospatial_lon_max,time_coverage_start,time_coverage_end,provider,date_update,data_mode,parameters
MYO-GL-1,ftp://ftp.bsh.de/outgoing/rcnws/myocean/latest/20120523/GL_LATEST_PR_PF_6900655_20120523.nc,56.21,56.21,-21.729,-21.729,2012-05-23T05:24:22Z,2012-05-23T05:24:22Z,UNIVERSITY COLLEGE (GALWAY),2012-05-24T00:12:10Z,R,PRES PSAL TEMP
MYO-GL-1,ftp://ftp.bsh.de/outgoing/rcnws/myocean/latest/20120523/GL_LATEST_PR_PF_6900799_20120523.nc,69.398,69.398,0.795,0.795,2012-05-23T23:57:25Z,2012-05-23T23:57:25Z,Institute of Marine Research,2012-05-24T10:13:24Z,R,PRES PRES_ADJUSTED TEMP PSAL DOX2 CHLT
.....
MYO-NO-1,ftp://ftp.bsh.de/outgoing/rcnws/myocean/latest/20120524/NO_LATEST_TS_MO_DunkerqueTG_20120524.nc,51.0481,51.0481,0.0394,0.0394,2012-05-24T00:00:00Z,2012-05-24T23:59:00Z,SHOM,2012-05-25T13:01:20Z,R,DEPTH TEMP SLEV
.....
MYO-NO-1,ftp://ftp.bsh.de/outgoing/rcnws/myocean/latest/20120524/NO_LATEST_TS_MO_Elbe_20120524.nc,54.0167,54.0167,8.1139,8.1139,2012-05-24T00:00:00Z,2012-05-24T23:59:59Z,BSH,2012-05-25T08:15:06Z,R,DEPTH VDIR VAVH TEMP
MYO-NO-1,ftp://ftp.bsh.de/outgoing/rcnws/myocean/latest/20120524/NO_LATEST_TS_MO_Emden_20120524.nc,53.3366,53.3366,7.1864,7.1864,2012-05-24T00:00:00Z,2012-05-24T23:59:59Z,BSH,2012-05-25T08:15:11Z,R,DEPTH SLEV
MYO-NO-1,ftp://ftp.bsh.de/outgoing/rcnws/myocean/latest/20120524/NO_LATEST_TS_MO_Esbjerg_20120524.nc,55.4667,55.4667,8.4333,8.4333,2012-05-24T00:00:00Z,2012-05-24T23:50:00Z,DMI,2012-05-25T13:01:23Z,R,DEPTH TEMP SLEV
```

Users are advised to use these index files select and then download the files they are interested in. For example, if a user is interested in retrieving the files that provide data in a specific area, he just has to select the lines for which Lat,Lon are incuded in the box [lat_min,lon_min: lat_max,lon_max] , store the complete file name in a list and then perform a get of all the files of the list

An example of script is available at http://www.coriolis.eu.org/Data-Services-Products/MyOcean-In-Situ-TAC/Documentation

V.3 Description of the platform Index

At the top of each FTP site there is a platform index file that is updated daily and that register the list of the individual platforms that are available on the server. This is very usefull for fixed platforms

Each platform index contains a line per platform with the following information:

- product_id MYO-XX-YY
    - MYO: MyOcean trigram
    - XX: region bigram (see §VI)
    - YY: product version

Example: MYO-NO-01

- file_name
- geospatial_lat_min
- geospatial_lat_max
- geospatial_lon_min
- geospatial_lon_max
- time_coverage_start
- time_coverage_end
- provider
- date_update
- data_mode
    - R: real-time data
    - D: delayed-mode data
- parameters (separator : blank)

MyOcean in-situ data file platform index example

```
# Title : in-situ platforms catalog
# Description : catalog of available in-situ platforms.
# Project : MyOcean
# Format version : 1.0
# Date of update : 20130107051747
#
platform_code,creation_date,update_date,wmo_platform_code,data_source,institution,institution_edmo_code,parameter,last_latitude_observation,last_longitude_observation,last_date_observation
07359400,30/09/2011 11:16:22,08/03/2012 10:19:30,5BUY2,MO_XXXXXX_PR_XB_5BUY2,"ENEA",,DEPTH DEPTH_DM TEMP TEMP_DM,31.57,32.40383,19/10/2010 01:21:00
07616353,22/02/2012 20:36:32,05/03/2012 14:59:31,IBSZ,MO_XXXXXX_PR_XB_IBSZ,"ENEA",,TEMP,31.9475,28.485,19/02/2012 18:21:00
08642751,30/09/2011 11:16:22,08/03/2012 10:19:10,IGMA,MO_XXXXXX_PR_XB_IGMA,"ENEA",,DEPTH DEPTH_DM TEMP TEMP_DM,39.80067,12.7065,28/09/2011 04:00:00
........
0n23w,13/12/2012 18:57:33,06/01/2013 21:47:51,31007,GL_XXXXXX_TS_MO_0n23w GL_LATEST_TS_MO_0n23w,"US DOC NOAA ERL PMEL SEATTLE",,DC_REFERENCE DEPH ATMS WSPD RELH DRYT WDIR TEMP PSAL WTODIR WSPN WSPE NSCT HCSP EWCT HCDT ATMP,-.007,-22.975,05/01/2013 12:00:00
0n80.5e,13/12/2012 18:57:57,06/01/2013 21:47:51,23001,GL_LATEST_TS_MO_0n80.5e GL_XXXXXX_PR_TE_0n80.5e GL_XXXXXX_TS_MO_0n80.5e,"US DOC NOAA ERL PMEL SEATTLE",,DC_REFERENCE DEPH DRYT RELH ATMS PSAL TEMP NSCT EWCT HCSP HCDT WDIR WSPD PRES ATMP,.074,80.529,05/01/2013 12:00:00
1.173,10/12/2012 04:10:42,10/12/2012 04:10:42,1.173,GL_XXXXXX_PR_BA_1.173,"Unknown institution",,DC_REFERENCE DEPH TEMP,46.2167,-39.3833,16/06/2007 02:54:59
1.2,10/12/2012 04:16:46,10/12/2012 04:16:46,1.2,GL_XXXXXX_PR_BA_1.2,"Unknown institution",,DC_REFERENCE DEPH TEMP,34.5167,-64.2667,07/02/2009 00:32:59
........
2900451,20/11/2011 20:04:01,05/01/2013 21:45:51,2900451,GL_XXXXXX_PR_PF_2900451 GL_LATEST_TS_PF_2900451 GL_LATEST_PR_PF_2900451 GL_XXXXXX_TS_PF_2900451,"KOREA METEOROLOGICAL ADMINISTRATION",1054,DC_REFERENCE PRES PRES_ADJUSTED TEMP TEMP_ADJUSTED PSAL PSAL_ADJUSTED,37.026,131.30299,03/01/2013 22:48:00
2900452,13/11/2011 19:23:16,05/01/2013 21:45:52,2900452,GL_XXXXXX_PR_PF_2900452 GL_XXXXXX_TS_PF_2900452 GL_LATEST_PR_PF_2900452 GL_LATEST_TS_PF_2900452,"KOREA METEOROLOGICAL ADMINISTRATION",1054,DC_REFERENCE PRES PRES_ADJUSTED TEMP TEMP_ADJUSTED PSAL PSAL_ADJUSTED,41.049,133.147,03/01/2013 22:04:43
......
CorunaTG,22/02/2012 11:36:17,07/01/2013 05:27:54,,IR_LATEST_TS_MO_CorunaTG IR_XXXXXX_TS_MO_CorunaTG,"Puertos del Estado (Spain)",540,SLEV,43.36,-8.39,06/01/2013 06:50:00
Cromer,15/01/2012 20:38:27,06/01/2013 20:04:49,Cromer,IR_XXXXXX_TS_MO_Cromer NO_LATEST_TS_MO_Cromer NO_XXXXXX_TS_MO_Cromer,"POL METOFFICE (UK)/POL/DMI",540,SLEV TEMP,52.9339,1.3035,06/01/2013 09:45:00
CuxhavenTG,01/04/2012 20:03:48,03/01/2013 00:02:41,,NO_LATEST_TS_MO_CuxhavenTG NO_XXXXXX_TS_MO_CuxhavenTG,"BSH",540,SLEV,53.8678,8.7175,29/12/2012 01:09:59
.....
D151,04/12/2011 20:23:16,07/01/2013 06:57:42,,NO_LATEST_TS_MO_D151 NO_XXXXXX_TS_MO_D151,"Deltares",540,VTDH_h1d3 VAVH SWHT VTZA_th1d3 VTZA_tz,54.31665,2.93335,07/01/2013 03:10:00
...
DBBH,09/08/2011 12:10:34,17/12/2012 13:43:53,DBBH,GL_LATEST_PR_CT_DBBH GL_XXXXXX_PR_CT_DBBH,"GERMANY (Unknown)",540,DC_REFERENCE PRES TEMP FLU2 PSAL DEPTH PRES_DM TEMP_DM PSAL_DM DATA_MODE DIRECTION,-12.03983,-77.49,15/12/2012 17:25:07
```

V.4 Platform code convention

An individual platform may have different identification codes. The NetCDF global attributes can provide this information.

- Global attribute "platform_code" : **The global attribute "platform_code" is mandatory in MyOcean NetCDF data files**. ***It is unique within all MyOcean INS TAC portals*** .
- Global attribute "wmo_platform_code" :It contains the Call Sign assigned by WMO (World Meteorological Organization).This attribute is not mandatory. If it does not exist (example: sea-level stations do not have Call Signs), the attribute is not inserted in the NetCDF file.If it exists, but is not known (example: a drifting buoy), the attribute is left empty.
- Global attribute "ices_platform_code": It contains the platform code assigned by ICES (International Council for the Exploration of the Sea).This attribute is not mandatory. If it does not exist (example: drifting buoys do not have ICES codes), the attribute is not inserted in the NetCDF file.If it exists, but is not yet known (example: a research vessel), the attribute is left empty.

VI NOMENCLATURE OF FILES

VI.1 Netcdf

The products are stored using the NetCDF format.

NetCDF (network Common Data Form) is an interface for array-oriented data access and a library that provides an implementation of the interface. The netCDF library also defines a machine-independent format for representing scientific data. Together, the interface, library, and format support the creation, access, and sharing of scientific data. The netCDF software was developed at the Unidata Program Center in Boulder, Colorado. The netCDF libraries define a machine-independent format for representing scientific data.

Please see Unidata netCDF pages for more information, and to retrieve netCDF software package.

NetCDF data is:

* Self-Describing. A netCDF file includes information about the data it contains.

* Architecture-independent. A netCDF file is represented in a form that can be accessed by computers with different ways of storing integers, characters, and floating-point numbers.

* Direct-access. A small subset of a large dataset may be accessed efficiently, without first reading through all the preceding data.

* Appendable. Data can be appended to a netCDF dataset along one dimension without copying the dataset or redefining its structure. The structure of a netCDF dataset can be changed, though this sometimes causes the dataset to be copied.

* Sharable. One writer and multiple readers may simultaneously access the same netCDF file.

VI.2 Additional Convention within INS TAC

MyOcean in-situ TAC distributes data in NetCDF following the MyOcean and EuroGOOS recommendations.

The NetCDF OceanSITES format description is available at: http://www.coriolis.eu.org/Data-Services-Products/MyOcean-In-Situ-TAC/Documentation

VI.2.1 Data Flags

The quality control flags indicate the data quality of the data values in a file, and are normally assigned after quality control procedures have been performed. These codes are used in the <PARAM>_QC variables to describe the quality of each measurement.

Code	Meaning	Comment
0	No QC was performed	-
1	Good data	All real-time QC tests passed.
2	Probably good data	-
3	Bad data that are potentially correctable	These data are not to be used without scientific correction.
4	Bad data	Data have failed one or more of the tests.
5	Value changed	Data may be recovered after transmission error.
6	Not used	-
7	Not used	-
8	Interpolated value	Missing data may be interpolated from neighbouring data in space or time.
9	Missing value	-

VI.2.2 Region bigrams

For file and directory naming conventions, a bigram is used to identify the regional TACs

Code	Institute
AR	Arctic-ROOS
BO	BOOS, Baltic Sea
BS	Black Sea
GO	Global Ocean
IR	IBI-ROOS, south west shelves
MO	MOON, Mediterranean sea
NO	NOOS, north west shelves

VI.2.3 Data types

MyOcean insitu NetCDF files handle 3 types of data: vertical profiles, time-series and trajectory data. This information is reported in the global attribute section of NetCDF files:

- data_type = "OceanSITES vertical profile" ;
- data_type = "OceanSITES time-series data" ;
- data_type = "OceanSITES trajectory data" ;

VI.2.4 Citation, distribution statement

In the global attribute section of NetCDF files, the citation and distribution statement should be reported as follow:

- distribution_statement="These data follow MyOcean standards; they are public and free of charge. User assumes all risk for use of data. User must display citation in any publication or product using data. User must contact PI prior to any commercial use of data. More on: http://www.myocean.eu/data_policy"
- citation=" These data were collected and made freely available by the MyOcean project and the programs that contribute to it"

VI.3 Reading software

NetCDF data can be browsed and used through a number of software, like:

- ✓ ncBrowse: http://www.epic.noaa.gov/java/ncBrowse/,
- ✓ NetCDF Operator (NCO): http://nco.sourceforge.net/
- ✓ IDL, Matlab, GMT…

VI.4 Structure and semantic of NetCDF maps files

```
Attributes {
    NC_GLOBAL {
        String name "INS_CORIOLIS_GLO_TS_NRT_OBS latest profiles";
        String doc_external_link
"http://www.oceansites.org/data/index.html";
        String version "DODS/3.2";
        String owner "server manager";
        String contact "server manager email";
        String phenomenon_thesaurus_name "CF standard names";
        String quality_protocol "OceanSITES User's Manual v1.1";
        Int32 max_features_per_response 1000;
        Int32 total_profiles_in_dataset 126051;
        String phenomenon_list "TEMP,PSAL";
        Float32 lon_range 180.06, 180.0;
        Float32 lat_range -78.22, 88.651;
        Float32 depth_range -3270.7, 6553.5;
        Float64 time_range 1316649600000, 1319182382000;
        Float32 PSAL_range -3.84, 68.99;
        Float32 TEMP_range -8.192, 62.208;
    }
    location._id {
        String long_name "sequence id";
        Int32 missing_value 2147483647;
        String units "";
    }
    location.lon {
        String units "degree_east";
        String long_name "longitude";
        Float32 missing_value NaN;
        String axis "X";
    }
    location.lat {
        String units "degree_north";
        String long_name "latitude";
        Float32 missing_value NaN;
        String axis "Y";
    }
    location.time {
        String units "msec since 1970-01-01 00:00:00 GMT";
        String long_name "time";
        Float64 missing_value NaN;
        String axis "T";
    }
    location.attributes.label {
        String units " ";
        String long_name "name of the feature";
        String missing_value " ";
    }
    location.attributes.description {
        String units " ";
        String long_name "description of the feature";
        String missing_value " ";
```

```
}
location.attributes.platform_number {
    String units " ";
    String long_name "platform unique identifier";
    String missing_value " ";
}
location.attributes.list_param {
    String units " ";
    String long_name "oceanic parameters list";
    String missing_value " ";
}
location.position_qc {
    String units " ";
    String long_name "position quality flag";
    Float32 missing_value NaN;
}
location.time_qc {
    String units " ";
    String long_name "time quality flag";
    Float32 missing_value NaN;
}
location.attributes.pi_name {
    String units " ";
    String long_name "name of principal investigator";
    String missing_value " ";
}
location.attributes.date_update {
    String units " ";
    String long_name "Date of update of this file in ISO format";
    String missing_value " ";
}
location.attributes.wmo_platform_code {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.data_type {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.institution {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.site_code {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.source {
    String units " ";
    String long_name "";
    String missing_value " ";
}
```

```
location.attributes.history {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.data_mode {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.quality_control_indicator {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.quality_index {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.references {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.comment {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.title {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.naming_authority {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.cdm_data_type {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.area {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.contact {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.author {
```

```
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.data_assembly_center {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.distribution_statement {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.citation {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.update_interval {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.attributes.qc_manual {
    String units " ";
    String long_name "";
    String missing_value " ";
}
location.profile.pres {
    String units "decibar";
    String long_name "pressure";
    Float32 missing_value NaN;
    String axis "Z";
}
location.profile.pres_QC {
    String units "";
    String long_name "quality flag";
    Float32 missing_value NaN;
}
location.profile.TEMP {
    String units "degree_Celsius";
    String standard_name "sea_water_temperature";
    String long_name "sea water temperature in-situ ITS-90 scale";
    Float32 missing_value NaN;
}
location.profile.TEMP_QC {
    String units "";
    String long_name "quality flag";
    Float32 missing_value NaN;
}
location.profile.PSAL {
    String units "psu";
    String standard_name "sea_water_salinity";
    String long_name "practical salinity";
    Float32 missing_value NaN;
```

```
    }
    location.profile.PSAL_QC {
        String units "";
        String long_name "quality flag";
        Float32 missing_value NaN;
    }
}
```

VII QUALITY CONTROLS

The MyOcean real-time and delayed-mode quality controls are described in the MyOcean quality control manual.

The Near Real Time Quality control procedure approved by MyOcean in situ TAC and endorsed in 2010 by EuroGOOs is available at http://www.coriolis.eu.org/Data-Services-Products/MyOcean-In-Situ-TAC/Documentation